

**ORIGINAL ARTICLE****STUDY OF LOCOMOTOR DISABILITY DUE TO VARIOUS TYPES OF TRAUMA****Sandip Ramesh Rao Dhole<sup>1</sup>, Anil Kumar Gaur<sup>2</sup>, Sumedh Narayan More<sup>3</sup>, Harshanand Popalwar<sup>4</sup>, Vaibhav Lokhande<sup>5</sup>**

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**ABSTRACT**

**Background:** Many people in the world live with different disabilities. Among various types of disability locomotor disability is one of the major types. Trauma is important cause of locomotor disability and in India it is second most common cause of locomotor disability. There is insufficient data available in India to determine contribution of trauma to locomotor disability. This study is required for the same so as to know the extent of problem of disability in Indian society.

**Materials and Methods:** All the patients attending the out-patient department of institute were examined after taking verbal consent. Patients having locomotor disability were included in this study.

**Results:** In our study persons having traumatic permanent locomotor disability were found to be 524 among total 3500 locomotor disabled persons attending our institute. Total numbers of new patients attending our institute were 11990 during study period. The prevalence of locomotor disability was 29.19% (3500) out of total 11990 patients attended this institute. The prevalence of traumatic permanent locomotor disability was 14.97% (524), among all (3500) locomotor disabled patients. The cause of disability in 41.8% was railway accidents, 41.6 % was due to road traffic accidents, 12.2% due to machine injuries, 4% due to fall, 0.2% due to bullet injuries, 0.2% due to sports injuries. . It was observed that 85.1% (446) out of 524 are males and 14.9% (78) out of 524 are females having locomotor disability due to trauma.

**Conclusion:** Trauma contributes not only to significant number of disabilities, but also to severity of disability. Road traffic accidents and railway accidents are major causes of traumatic locomotor disability and young persons are the usual victims of such disasters.

**Key words:** Locomotor disability, Machine injuries, Rail accidents, Road traffic accidents, Trauma.

**INTRODUCTION**

Around the world more than a billion people live with disabilities and a significant proportion of disabilities are caused by injuries including those which result from traffic crashes, falls, burns, and acts of violence such as child abuse, youth violence, intimate partner violence, and war and conflict.<sup>1</sup>

All disabled people are impaired, and all handicapped people are disabled, but a person can be impaired

and not necessarily be disabled, and a person can be disabled without being handicapped.

The analysis of the Global Burden of Disease 2004 data estimates that 15.3% of the world population (some 978 million people of the estimated 6.4 billion in 2004) had "moderate or severe disability", while 2.9% or about 185 million experienced "severe disability".<sup>1</sup> The National Sample Survey Organization (NSSO, 2003) estimated the number of persons with

disabilities in India to be 1.8% (49-90 million) of the Indian population.<sup>2</sup> The census of India (2001) has revealed that over 21 million people in India are suffering from one or other kind of disability. This is equivalent to 2.1 % of the population. Among the total disabled in the country, 12.6 million are males and 9.3 million are females.<sup>3</sup>

Trauma is important cause of locomotor disability and in India it is second most common cause of locomotor disability.<sup>2</sup> The national sample survey (2002) estimated 10.66 million persons are having locomotor disability in the country. It is observed that of all persons having locomotor disability the proportion (per 1000) of them with deformity of limb is the maximum among the different types of locomotor disability. Among the different causes of locomotor disability, polio was found to be the major cause. The next important cause is "injuries other than burns" accounting for 26 to 27%.<sup>2</sup> There are various causes of traumatic locomotor disability such as road traffic accidents, railway accidents, falls, bullet injuries, machine injuries.

Though there are many studies available outside, there have not been many studies in India to determine contribution of trauma to loco motor disability. This study is required for the same so as to know the extent of problem of disability in Indian society.

## MATERIALS AND METHODS

This observational study was conducted in a tertiary care physical medicine and rehabilitation center in western India. All the patients attending the outpatient department of institute were examined after taking verbal consent. Patients having locomotor disability were included in this study. This study was conducted from November 2011 to November 2012 on the persons/patient attending the outpatient department.

This study was started after approval of Institutional Ethics Committee. Verbal consent was taken prior to examination of patient.

All the patients attending the institute were first examined in OPD. Patients having locomotor disability due to trauma were considered for the study. This study was conducted to assess the prevalence of permanent locomotor disability due to trauma among the persons with disability attending one of the rehabilitation centre in Mumbai; to find out dis-

tribution of traumatic causes of locomotor disability; to study locomotor disability due to trauma according to part of body affected; and to study pattern of traumatic locomotor disability among different age groups and sex.

**Inclusion criteria:** This study includes cases of all age group and both sex with Loco motor disability due to trauma attending the rehabilitation institute.

**Exclusion criteria:** Persons with loco motor disability due to cause other than traumatic and disabled patient other than loco motor disability were excluded from the study.

## RESULTS

In our study persons having traumatic permanent locomotor disability were found to be 524 among total 3500 locomotor disabled persons attending our institute. And total numbers of new patients attending our institute were 11990 during study period. The prevalence of locomotor disability was 29.19% (3500) out of total 11990 patients attended this institute. The prevalence of traumatic permanent locomotor disability was 14.97% (524) among all (3500) locomotor disabled patients.

In our study we found that the cause of disability in 41.8% was railway accidents, 41.6 % was due to road traffic accidents, 12.2% due to machine injuries, 4% due to fall, 0.2% due to bullet injuries, 0.2% due to sports injuries. It was observed that 85.1% (446) out of 524 are males and 14.9% (78) out of 524 are females having locomotor disability due to trauma. It was observed that 37.8% (198) out of 524 persons are affected in the age group 21 to30 and 34% (178) persons are in the age group of 31 to 40.

**Table 1: Causes of traumatic locomotor disability in males and females**

Causes of traumatic locomotor disability	Male (n=446)	Female (n=78)
Falls	18	3
Machine injuries	60	4
Railway Accidents	178	41
Road Traffic Accidents	188	30
Bullet Injuries	1	0
Sport Injuries	1	0

Railway accidents and road traffic accidents found to be major causes affecting 178 (42.15%) and 188

(39.91%) out of 446 males respectively. Railway accidents and road traffic accidents found to be major causes affecting 41 and 30 out of 78 females respectively.

**Table 2: Cause of Locomotor Disability due to trauma in different age groups**

Cause of traumatic Locomotor Disability	Age group			
	0-20	21-40	41-60	61-80
Falls	1	12	5	3
Railway Accidents	9	164	37	9
Road Traffic Accidents	17	150	42	9
Machine injuries	5	50	9	0
Bullet injuries	0	0	1	0
Sport Injuries	1	0	0	0

**Table 3: Distribution of Locomotor Disability due to trauma according to Body Parts**

Body part affected	Subjects	
Upper Limb	Right	105
	Left	64
Lower Limb	Right	225
	Left	168
Trunk		27

**Table 4: Distribution of severity of locomotor disability due to trauma (N=524)**

Disability Percentage	No. (%)
0-25	45 (8.59)
26-50	58 (11.07)
51-75	205 (39.12)
76-100	216 (41.22)

**Table 2** shows distribution of causes of locomotor disability among age group 0-20, 21-40, 41-60 and 61-80 years. Railway accidents and road traffic accidents found to be major causes and 21-40 years age group is the most vulnerable population.

**Table 3** shows distribution of locomotor disability according to body parts. **Table 4** shows distribution of traumatic locomotor disability according to disability percentage.

**DISCUSSION**

This study conducted in a representative sample of Indian population, estimates the distribution of traumatic locomotor disability (TLD) according to cause, age, sex, part of body affected and severity of disability among the patients attending a rehabilita-

tion centre in Mumbai. The current study estimated the prevalence of locomotor disability among all patients (11990) attending a rehabilitation centre in Mumbai to 29.19% (3500). The prevalence of traumatic locomotor disability was 14.97% (524) among all locomotor disabled patients (3500).

According to Census of India 2001, the prevalence of locomotor disability was 28% among all disabled population in India.<sup>3</sup> The current study also estimated the similar prevalence of total disabled population with locomotor disability. National Sample Survey (NSS), 58<sup>th</sup> round 2002 estimated the prevalence of locomotor disability at 51% out of which 26.7% were traumatic in origin.<sup>2</sup> Current study, however, estimated somewhat different pattern as compared to NSS.

The prevalence of locomotor disability due to trauma in the current study is higher (14.97) as compared to other studies where the prevalence of less than 2% has been reported.<sup>4,5,6</sup> The reason may be that in current study, the prevalence of locomotor disability due to trauma in the rehabilitation institute was calculated, however in other studies prevalence of locomotor in general population was calculated.

A study conducted in the community staying near rural health center in Goa found the prevalence of locomotor disability was 0.92%, and majority were due to fracture of long bones in young population due to road traffic accident and stroke in old age.<sup>7</sup>

Another study conducted in black people of Nyaga estimated the prevalence of locomotor disability and TLD in general population at 1.8% and 31.6% respectively.<sup>5</sup> High prevalence of TLD in above study may be because the study was conducted in general population where as our study was conducted in a rehabilitation centre where majority of disabled patients attending outpatient department included suffering from non-traumatic cause viz. poliomyelitis, cerebral palsy, cerebro-vascular accidents, etc.

In the current study it was found that road traffic accidents (41.6%) and railway accidents (41.8%) were the major causes of TLD in all age groups. Railway is a major transport system in Mumbai where study was conducted. Thus may be reason for railway accident being most common cause of TLD in the city (MUMBAI).

In the current study, 85.1% of males and 14.9% of females were suffering from TLD. Males were suffering five times more than females. A study con-

ducted on the pattern and causes of rural based locomotor disabled found incidence of locomotor disability in males are four times more than in the females, which is similar to current study.<sup>8</sup> However, another study conducted to find factors affecting progress of locomotor disability in a slum in Mumbai found most of individuals with locomotor disability were females. Similar findings have been observed in census 2001, where Tamil Nadu was observed to have a higher number of disabled females than males.

According to current study, railway accidents (164) (31.29%) and RTAs (150) (28.62%) were the leading causes of TLD among age group of 21-40 years. This could be correlated with the fact that this age group is working group and most vulnerable to such mishaps. In the current study percentage of individuals having locomotor disability due to trauma in age group of 20 to 40 is 70%. However rail accidents and road traffic accidents were reported as most common culprits behind traumatic disability in all age group patients.

In a study done on 331 victims of road traffic accident at KMC, Manipal Karnataka in 2001, revealed that the maximum number of victims 23(26%) were in the age group of 21-30 years, followed by 17(20%) in 41-50 years age group. Male to female relation was 7:1 which coincides with findings of current study.<sup>9</sup>

Injuries are a major cause of death and disability among young people. The WHO estimates that some 5.8 million people died of injuries in 1998. This figure is predicted to rise over the next 2 decades to 8.4 million, largely because of predicted rise in men in the 15–29 year age group. Injuries are also an important cause of long-term disability worldwide, with much of the burden once again falling on the young. Despite the higher risk of injury faced by young people, relatively little is known about the long term impact of trauma on this age group.<sup>10</sup>

In 1993, Barker and Power used data from the National Child Development Study to ascertain a UK population prevalence of permanent disability following accident in those aged 16–23 years of 28 per 1000. Injury occurring in young adulthood was found to be an important cause of long-term disability as between a third and a half of subjects with onset of disability after the age of 16 had injury as a cause. However, only limited information was collected as to the nature of the disability experienced. In the only other published UK population based

study of the long-term outcome of major trauma, Braithwaite reported that 1 in 2 people had moderate, severe or very severe disability. They did not however, describe the degree or nature of the disability experienced by young people within the cohort. Other papers have focused only on specific types of trauma (usually head or brain injury) or on younger age groups.<sup>11</sup>

Kuala Selangor showed that the prevalence increased with age, being as low as 0.6% in the 7-14 year age group and as high as 20.5% in the above 55 year age group. Similarly physical disability among Canadians reporting overall prevalence 5.01 % in the adults with 0.62 % in 15 to 24 years age group and 26.47 % in the age group >85 yrs. Similar results were reported by current as well as many other studies. Injury as a cause of their disability was reported by many affected individuals in the study. Similar results were also observed in other studies, where locomotor disability due to injury was reported as 31.6 % and 41.2 % respectively.<sup>12</sup>

So from above studies it is clear that locomotor disability due to trauma is more prevalent in young population which is similar to current study. Global and regional estimates of the injury-specific causes of disability are lacking. However in the current the prevalence of various causes of traumatic locomotor disability were found according to age and sex.

Most of the cases of TLD were of high grade severity. 39.12% patients were 51-75% disabled and 41.22% patients were 76-100% disabled. This reflects patients with TLD were affected higher severity. In most patients with TLD, lower limbs were affected more commonly than upper limb. This might be because of higher percentage of RTAs and rail accidents as cause of TLD.

This study described causes of TLD with respect age and sex. No other study described these characteristics. As this study included patients only attending to rehabilitation center in Mumbai, the results cannot be extrapolated to general population. Also demographic characters and causes of disability may differ from general population. This limits the large extrapolation of results.

## CONCLUSIONS

Among various types of disability locomotor disability is one of the major types. Locomotor disability is

caused by various factors. A billion people worldwide are rendered disabled by injuries resulting from road traffic accidents, crashes, falls, railway accidents, act of violence etc. Global and regional estimates of the injury-specific causes of disability are lacking. However, estimates from some countries suggest that up to one quarter of disabilities may result from injuries and violence.<sup>1</sup> Trauma is important cause of locomotor disability and in India it is second most common cause of locomotor disability. There have not been many studies in India to determine contribution of trauma to loco motor disability.

In the current study we found that road traffic accidents(41.6%) and railway accidents(41.8%) are the major causes of traumatic locomotor disability in rehabilitation center in Mumbai. Railway is major transport system in Mumbai where study was conducted. Thus may be reason for railway accident being most common cause of TLD in the city (Mumbai).

We also found that males are more commonly affected than females. It was seen that most of the persons are young; in the age group of 21 to 40. In males and females most important causes of traumatic locomotor disability are road traffic accidents and railway accidents. Also in the young persons the most important causes are road traffic accidents and railway accidents. Loss of limb (lower > upper) is the most frequent impairment. In our study most of the persons have disability more than 50%.

To conclude trauma contributes not only to significant number of disabilities, but also to severity of disability. Road traffic accidents and railway accidents are major causes of traumatic locomotor disability and young persons are the usual victims of such disasters.

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